

Arizona Department of Health Services
**Plume Exposure and Ingestion Pathway
Emergency Planning Zone (EPZ)**
Emergency Response Plan for a
PVNGS Event



**Division of Public Health Services
Bureau of Emergency Preparedness and Response**

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Introduction:

The Nuclear Regulatory Commission (NRC) has established two Emergency Planning Zones (EPZ) around each commercial nuclear power plant in the nation. The zone within 10 miles (16 km) of the plant is designated the Plume Exposure Pathway EPZ and the region within 50 miles (80 km) from the plant is the Ingestion Exposure Pathway EPZ. This plan documents the response activities of both of these EPZ in response to an event at the Palo Verde Nuclear Generating Station. (PVNGS)

Goals of Plan:

- 1) Limit the amount of radiation exposure to the public
- 2) Protection of the public from radiation as a consequence of inhalation, absorption and ingesting substances such as food, milk and water contaminated with radioactive materials
- 3) Withholding and destruction of contaminated retail food from commerce

Authorities:

The following citations represent portions some of the statutory authorities available to the Department for a Plume Exposure and Ingestion Pathway EPZ response. For additional authorities during an emergency with public health implications, please refer to the ADHS Emergency Response Plan Authorities section located on SIREN at: *State Health/Response Plans/ADHS Plans/Emergency Response Plans* and the Arizona Revised Statutes (ARS) available at: <http://www.azleg.state.az.us/arizonarevisedstatutes.asp>

ARS§36-104

Powers and Duties (of the Department)

ARS§36-132

Department of health services; functions; contracts

ARS§36-136

Powers and duties of director, compensation of personnel

ARS§36-601

Public nuisances dangerous to public health

ARS§36-904

Food Adulteration

ARS§36-910

Seizure (Food Embargo Authority)

ARS§41-1081

Standards for delegation

(This statute describes the criteria for developing delegation agreements and making them valid)

Department Roles and Responsibilities:

The Arizona Department of Health Services (ADHS) will:

- Support the local health departments in response activities
- Broker resources as much as possible including hospital space and emergency medical services.
- Provide a Public Information Officer to craft (in conjunction with the local health departments) various health messages for the State Emergency Operations Center's Joint Information Center
- Provide oversight and guidance in conjunction with the Arizona Radiation Regulatory Agency (ARRA) for the distribution of potassium iodide (KI) through the Maricopa County Department of Public Health.
- Coordinate with the Centers for Disease Control and Prevention (CDC)
- Order the Strategic National Stockpile if needed (See ADHS SNS Plan)
- Work with the CDC, Agency for Toxic Substances and Disease Registry (ATSDR) and local health departments to put together a registry

Concept of Operations:

The purpose of this plan is to provide more detailed response activities that support and are an extension of Emergency Support Function (ESF) #18 Nuclear Power Radiological Emergency Preparedness Annex in the State Emergency Response and Recovery Plan as well as the State of Arizona – Maricopa County Offsite Emergency Response Plan for Palo Verde Nuclear Generating Station. Both are located on SIREN at: *State Health/Response Plans/ADEM Plans*. The Arizona Department of Health Services is considered a support agency in this response.

Evacuation:

Currently, there are three Reception and Care Centers (RCCs) for persons residing in the 10 mile plume exposure EPZ 1) Buckeye Union High School, 2) Desert Edge High School, and 3) Wickenburg High School. The Arizona Department of Health Services Licensing Services Group will work closely with the Arizona Department of Economic Security (DES) to identify special needs individuals who might need assistance during evacuation. In addition, the Licensing Services Group will also identify licensed facilities within the plume exposure EPZ and coordinate assistance to those residing in the facilities in the event of an evacuation.

Potassium Iodide (KI) Distribution:

Administration of KI may occur in a radiological event to help prevent damage to the thyroid. (See Appendix L, CDC Fact Sheet) Although ADHS provides consultation and oversight in the process, the distribution of KI at the Reception and Care Centers (RCC) is the responsibility of the Maricopa County Department of Public Health, who may request assistance if needed. Procedures for this activity are identified in the MCDPH clinical protocol Distribution of Potassium Iodide in a Radiation Emergency. Currently, there are three schools in the plume exposure zone. 1) Ruth Fisher/Tonopah Valley Schools, 2) Palo Verde, and 3) Arlington. Each

of these schools has a KI distribution plan. KI is distributed on the school buses as the children are evacuated. A limited amount of liquid KI is available for those children who cannot swallow pills.

Sheltering in Place With Pets:

The Centers for Disease Control and Prevention have a webpage which addresses “Sheltering in Place during a Radiation Emergency”: www.bt.cdc.gov/radiation/shelter.asp

Within that webpage, the following recommendations are made to the public, when sheltering in the home is advised by authorities:

“If you have pets, prepare a place for them to relieve themselves in the shelter. Pets should not go outside during a radiation emergency because they may track radioactive materials from fallout into the shelter. Preparing a place for pets will keep the radioactive materials from getting inside the shelter.”

Evacuation with Pets:

Due to the likelihood of certain species of pets being outdoors at the time of a release, there is a slight increase in risk of exposure to radiation for the pets and their owners. However, residents are encouraged to evacuate with their pets, not only for their pet’s safety, but also as to decrease the risk of inappropriate or unsafe reentry attempts by pet owners. Exceptions to this recommendation are when the resident owns livestock, which should be sheltered in place in a barn or other shelter with extra feed and covered water supplied by the resident prior to departure. Although pets are not allowed in the RCC, if residents in the communities surrounding PVNGS are advised to evacuate instead of sheltering in place, many will arrive with their pets.

Decontamination of Pets at Reception and Care Centers: RCCs)

Within the 2006 Arizona – Maricopa County Offsite Emergency Response Plan for Palo Verde Nuclear Generating Station, the Emergency Response Operations (ERO) section addresses animal health and care on page ERO-6-3 and in Tab B: Reception and Care Center Flow Chart on page ERO-6-B-1.

“The RCC Coordinator is responsible to ensure that:

- 1) Arriving evacuees with animals are instructed to remain with their animals until the Arizona Humane Society has established temporary holding capability at the RCC.
- 2) The Grand Canyon of the ARC (American Red Cross) has requested activation of the agreement with the Arizona Humane Society for support at the RCC.
- 3) The state veterinarian has been notified

The Arizona Humane Society and Maricopa County Animal Care and Control will coordinate the care, handling and temporary shelter of pets and non-commercial livestock that arrive with evacuees.”

Within Tab B, on page ERO-6-B-1, the following statement is made: “Animals and impounded vehicles will be surveyed and decontaminated as time and resources permit.”

KI for Pets:

In general, pet owners should be advised that due to the shorter life span of most pets compared to humans, their pet’s risk for thyroid cancer due to radiation exposure is lower. Stockpiles of KI should be reserved for prophylaxis for humans instead of animals. However, dosages for use of potassium iodide (instead of sodium iodide) could be considered for prophylaxis of pets, if there are more than sufficient KI doses for humans in the area.

Agriculture and Food:

Responsibility for the radiation testing of all exposed food lies with the Arizona Radiation Regulatory Agency (ARRA) or their Federal designee and that for general food safety is delegated through delegation agreements to the Maricopa County Environmental Services Department by the Arizona Department of Health Services. In addition to radiological contamination there may be more traditional food safety circumstances to contend with such as proper refrigeration of foods in the event of a power outage.

The responsibility of the Maricopa County Environmental Services Department for safe food includes produce warehouses, food processing, outdoor settings, (special events) school cafeterias, restaurants and retail settings (grocery stores, convenience stores). The responsibility for the safety of eggs, dairy, raw meats, grains and fresh fruits and vegetables (in the field or on the farm) is overseen by the Arizona Department of Agriculture. The Arizona Department of Agriculture has the authority under (ARS§ 3-107) to abate, suppress, control, regulate, seize, quarantine or destroy any agricultural product or food that has been adulterated or contaminated as the result of an accident at a commercial nuclear generating station. (See Appendix E, FDA Recommended Derived Intervention Levels (DILs) for Human Food and Animal Feed.

Registry:

A registry is comprised of the contact information of persons potentially exposed to radiation will be assembled with the collaboration of CDC, ATSDR, ADHS and Maricopa County Department of Public Health. The purpose of the registry is for subsequent dose assessments; possibly providing the registrants educational material regarding their exposures, possible medical follow-up should that become necessary and for addressing possible long-term health effects. The registry is comprised of a one-page survey instrument. CDC/ASTDR will provide the survey instrument and the personnel to assist ADHS and the Maricopa County Department of Public Health in this endeavor. (See Appendix M, ATSDR Fact Sheet and Appendix N, ATSDR Rapid Response Registry Survey Form)

Risk Assessments:

After the Incident (Mitigation) – Depending upon the severity and duration of the incident and upon request from the community, the ADHS Office of Environmental Health has the ability to conduct a public health risk assessment of the affected area(s). Human exposure routes that can be investigated include inhalation, ingestion or dermal exposure.

ADHS Public Health Incident Management System: (PHIMS)

Under this plan, the Department will utilize its incident command system called the Public Health Incident Command System (PHIMS) to manage the incident. (See Appendix A) The ADHS PHIMS response system is compliant with the National Incident Management System (NIMS) and is divided into four functional areas: Operations, Planning, Logistics and Finance.

Operations Communication Group will:

- Prepare environmental and public health messages for the public and healthcare practitioners covering a wide variety of public health issues such as:
 - Health effects of radiation exposure
 - general sanitation
 - safe food
 - water supply
 - vectors
 - animals (possible zoonotic diseases)

(See Appendix D – Sample Press Releases)

- Use technical information provided by ADHS subject matter experts to support the public information officer (PIO) and create materials for AZ-211, the ADHS 24 Hour Information line and the Department's website.
- Prepare public education materials such as public health brochures

Operations Environmental Health group will:

- Provide technical information related to public health issues such as the health effects of radiation exposure, sheltering-in-place, decontamination of food, having a source of potable water, safe food for consumption and maintaining sanitary conditions
- Give guidance and recommendations on food storage and food safety to the State Prison kitchens as well as Assisted Living and Group Homes.
- Inspect various shelters for sanitation and cleanliness
- Support (if needed) the local health departments and the Arizona Department of Agriculture in utilizing the embargo authority, conducting inspections of permitted facilities and gathering food samples
- Provide support to the Arizona Department of Environmental Quality and the local health departments to advise on safe drinking water and community water systems

Operations Behavioral Health Group:

The majority of persons will experience some stress associated with a PVNGS incident. An important component of the response to a release is the inclusion of behavioral health services

for first responders and the public. Incident specifics will dictate the components of the behavioral health response plan. However, listed below are some probable response activities.

- Transport of hospitalized patients to psychiatric facilities located outside of the fire zone
- Relocation and evacuation of group homes
- Daily crisis briefing with providers to oversee patient issues
- Identification of enrolled mentally ill clients in the shelters
- Consistent access to medication for clients displaced to other areas
- Assignment of mental health counseling teams to shelters
- Critical incident stress debriefing to first responders
- Dispatch crisis teams to staff help centers

Operations Hospital and Healthcare Group

- Serve as a point of contact to communicate with hospitals across the state with the EMSsystem (installation in statewide community healthcare clinics – in progress)
- Coordinate with the Licensing Services Group to support group homes, assisted living facilities, hospitals, community health centers, Indian Health Service (IHS) facilities and other healthcare facilities regarding public health issues
- Provide information regarding available resources (e.g. bed availability) for hospitals, community health centers and other healthcare facilities that are located in the evacuation area
- Identify available emergency medical services

Operations Licensing Services Group

- Coordinate with county public health departments to identify special needs and other supervised care facilities that may need to be evacuated or sheltered-in-place
- Grant temporary waiver of health care institution licensing requirements necessary for shelter-in-place, evacuation or receiving of additional patients from other evacuated facilities

Operations Human Surveillance/Epidemiology Group

- Tracking of epidemiological and registry data

The following Operations activities may also be required in the response. These groups are not listed on the PHIMS chart but can easily be activated.

- Provide biological and chemical testing (Laboratory Group)
- Acquire and maintain vital records

The Planning Section will cover the following activities:

- Creation of the PHIMS Chart
- Generation of the Incident Action Plan
- Documentation of the Incident Log on SIREN as necessary
- Collection of information and compilation of Situation Reports

- Creation of GIS maps as needed
- Preparation of weekly Governor's Reports

The Logistics Section will handle the following:

- Blast-faxing and other alerts and notifications through the Health Alert Network (HAN) and the EMSsystem
- Maintenance of standard and redundant communications equipment
- Tracking Department volunteers
- Obtaining the number of webpage hits to ADHS information pages
- Obtaining the number of callers to the 24-hour recorded information line
- Setting up and maintaining the equipment of the Health Emergency Operations Center (HEOC)

The Finance Section will perform the following:

- Tracking hours spent on response activities
- Give assistance with budgeting for the response
- Obtain contracts and procure needed items.

External Organizational Roles and Responsibilities

Maricopa County Department of Public Health

- With consultation from ARRA and ADHS is responsible for the distribution of KI to the public at the Reception and Care Centers (RCCs)

Maricopa County Environmental Services Department

- Responsible for the safety of foods (through a delegation agreement of ADHS) from the produce warehousing stage to the retail stage.

Arizona Radiological Regulatory Agency (ARRA)

- Oversees trained volunteers to conduct field sampling and radiological screening of persons
- Performs radiological analysis of water, soil, vegetation, milk and limited clinical samples either in their mobile laboratory or at their permanent facility
- Provides a liaison at the State Emergency Operations Center
- Provides a contact for the Joint Information Center (JIC)

Arizona Department of Agriculture

- Responsible for the integrity/safety of milk, eggs, meat, grain and fresh fruits and vegetables in the affected area.
- Responsible for establishing check points to ensure food that is being transported meets food safety standards

State Coordination

This plan follows the State Emergency Response and Recovery Plan (SERRP) Emergency Support Function (ESF) #18 Nuclear Power Radiological Emergency Preparedness Annex. The following general information was taken from this annex.

Primary Agencies for the PVNGS response:

- State - Arizona Division of Emergency Management Arizona Radiation Regulatory Agency
- County - Maricopa County Department of Emergency Management
- Private - Arizona Public Service Company

The Arizona Department of Health Services (ADHS) is listed as a support agency in this type of response.

There are four Incident Classifications (emergency classification levels) for the Palo Verde Nuclear Generating Station

1. Notification of Unusual Event
2. Alert Notification
3. Site Area Emergency Notification
(this level initiates the SEOC and the Radiological Technical Organization)
4. General Emergency Notification

For more detailed information regarding the roles and responsibilities of State and Local agencies, ESF 18 refers to: State of Arizona – Maricopa County Offsite Emergency Response Plan for Palo Verde Nuclear Generating Station for nuclear and radiological events. A copy of both of these plans is available on SIREN at: *State Health/Response Plans/ADEM Plans*

Federal Response:

The Department of Homeland Security (DHS) coordinates the Federal Government response to radiological incidents of National Significance in accordance with Homeland Security Presidential Directive-5 and the National Response Framework. The Nuclear/Radiological Incident Annex of the National Response Framework describes how the coordinating agencies and cooperating agencies support the Department of Homeland Security's overall coordination of the response to a nuclear/radiological Incident of National Significance. Coordinating agencies have specific nuclear/radiological expertise and assets to respond to an incident. If the incident or threat of an incident falls below the threshold of a nuclear/radiological Incident of National Significance, then the activities mentioned for the coordination and cooperation agencies in the Nuclear/Radiological Incident Annex of the National Response Framework may take place without the coordination of the Department of Homeland Security (DHS).

The Attorney General generally acting through the Federal Bureau of Investigation (FBI) has lead responsibility for criminal investigation of terrorist acts or terrorist threats.

(For a complete list of Federal roles and responsibilities, refer to the Nuclear/Radiological Incident Annex of the National Emergency Response Framework.

Interagency Modeling and Atmospheric Assessment Center (IMAAC)

- Production, coordination and dissemination of consequence predictions for an airborne hazardous materials release

The Federal Radiological Monitoring and Assessment Center (FRMAC)

- Coordinate radiological assessment and monitoring at or near the scene

The Federal “Advisory Team” (for Environment, Food and Health) includes representatives from the Department of Homeland Security, Environmental Protection Agency, Department of Agriculture (USDA), the Food and Drug Administration, the Centers for Disease Control and Prevention and other Federal agencies.

The Advisory Team develops coordinated advice and makes recommendations to DHS, State, local and tribal governments concerning environmental, food health and animal health matters such as:

- Environmental Assessments
- Protective Action Guides
- Protective Action Recommendations
- Protective Action Recommendations to minimize contamination through the ingestion pathway
- Contaminated livestock, poultry and foods (especially perishable commodities)
- Losses of agricultural resources
- Availability of food, animal feed and water supply inspection programs
- Relocation, reentry, and other radiation protective measures
- Recovery, return and clean-up issues
- Health and safety advice
- Estimated effects of radioactive releases on human health and the environment

APPENDICES:

A – PHIMS Organizational Chart

B – ARRA Volunteers

C – CDC Contact Information

D – **Sample** Press Releases

- ✓ What to do in a Nuclear Power Plant Emergency
- ✓ Notice to Food Processors and Distributors
- ✓ Notice to Retail Food Operations
- ✓ Notice to Outdoor Swimming Pool Operators
- ✓ Home Gardening Notice
- ✓ Notice to Special Events

E – FDA Recommended Derived Intervention Levels (DILs) for Human Food and Animal Feed

F – Fundamental Properties of Radiation

G – Examples of Radioactive Chemicals

H – Dose Limits and Exposure Guidance

I – Health Effects and Emergency Medical Conditions of Exposure to Radiation

J – Stay Time Table

K – Time Distance Shielding and the Inverse Square Law

L – KI Decision Tree

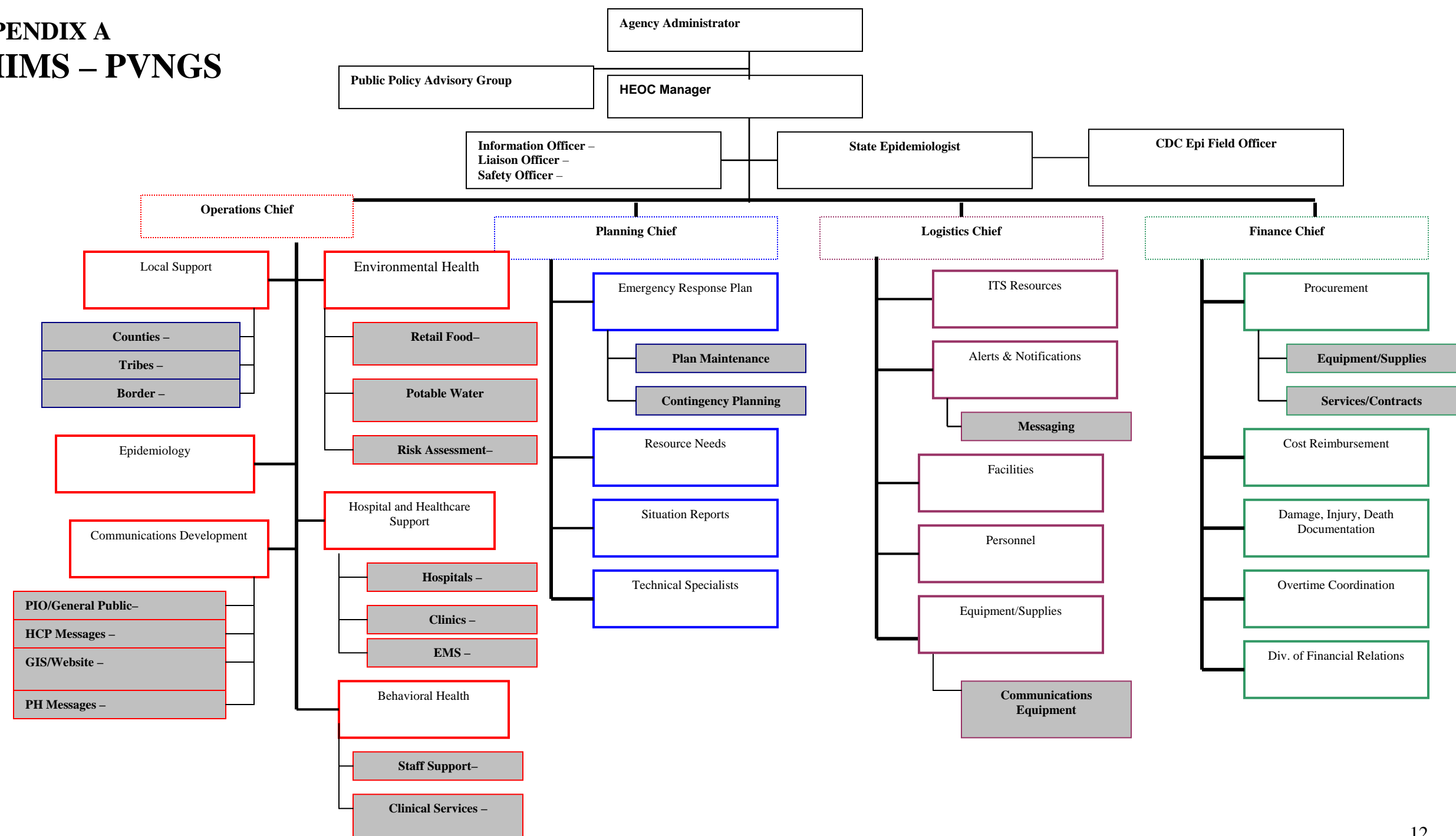
M - CDC KI Fact Sheet

N – ATSDR Fact Sheet

O – ATSDR Rapid Response Registry Survey Form

Note: Appendices F through K were compiled by Don Kautz, ADHS Industrial Hygienist and Safety Officer

APPENDIX A
PHIMS – PVNGS



APPENDIX B

ARRA Volunteers

The Arizona Department of Health Services provides several volunteers for Arizona Radiation Regulatory Agency (ARRA) Radiological Emergency Assessment Teams (REAT). The purpose of these teams is to provide field monitoring activities to obtain environmental and foodstuff samples and test them for radiological contamination. Other response duties include receiving samples (the “hotline”), radiological screening and potential decontamination of the sampling team and the general public, issue and management of dosimeters, screening and potential decontamination of vehicles and radio dispatch. These volunteers attend refresher courses and conduct annual field exercises to test portions of the State of Arizona – Maricopa County Offsite Emergency Response Plan for Palo Verde Nuclear Generating Station and ARRA’s standard operating procedures (SOP’s)

APPENDIX C

CDC Contact Information:

The CDC 24-Hour Emergency Response Hotline is: 770-488-7100. This number connects directly to the CDC’s EOC.

APPENDIX D

Sample Press Releases

The following examples are meant to be samples **only**. Information was obtained from <http://www.bt.cdc.gov/radiation> and the roles and responsibilities outlined in the State of Arizona – Maricopa County Offsite Emergency Response Plan for Palo Verde Nuclear Generating Station. All press releases must be reviewed internally and coordinated with the Maricopa County Department of Public Health, Maricopa County Environmental Services Department, Arizona Radiation Regulatory Agency, Arizona Department of Agriculture and ultimately with Arizona Division of Emergency Management (ADEM) Public Information Officer (PIO) at the State Emergency Operation’s Center (SEOC), Joint Information Center (JIC).

SAMPLE NEWS RELEASE

What to do in a Nuclear Power Plant Emergency

1. Keep calm. Not all incidents result in the release of radiation.
2. Stay tuned to local radio or television. Specific instructions will be given by authorities.
Local instructions always take precedence to anything written in this press release
3. Evacuate if you are advised to do so. Keep car windows and vents closed; use re-circulated air.
4. If you are advised not to evacuate, remain indoors.
 - Close doors and windows
 - Turn off the air conditioner, ventilation fans, furnace and other air intakes
 - Go to a room with as few windows as possible or a basement
 - If you must go outdoors, cover your nose and mouth with a handkerchief
5. Do not use the telephone unless absolutely necessary. All lines will be needed for emergency calls
6. If you have just been outdoors:
 - Change your clothes and shoes
 - Put the items you were wearing in a plastic bag
 - Seal the bag and store it out of the way
 - Clothes can later be washed as you normally would in the washing machine. Any contamination would remain in the water and not contaminate the washing machine
 - Take a thorough shower
7. Put food in covered containers or in the refrigerator. Food not previously in covered containers should be washed first
8. Washing should be done in a place other than in the kitchen to prevent contamination of foods and dishes

SAMPLE NEWS RELEASE

Notice to Food Processors & Distributors

Milk and food products in an area affected area can become contaminated during collection and processing. This can result from contact with radioactive materials that were deposited on the ground or from mixing with contaminated products. After a radiological emergency, state or county agencies may restrict shipment of food products if they are contaminated.

Processors – The Arizona Department of Agriculture will take samples of raw ingredients and the Maricopa County Environmental Services Department will take samples of processed or finished foods ready for retail. After testing, they will determine if the shipment is safe for distribution. This testing can take one or two days.

Do not process foods or release products until they are determined to be safe.

Distributors – The Arizona Department of Agriculture will take samples of milk, produce and meat. The Maricopa County Environmental Services Department will take samples of other items ready for retail. After testing, they will determine if the shipment is safe for distribution. This testing may take one or two days.

Do not release products until they are determined to be safe.

Cover food exposed to the elements (open vats or silos).

Put food in covered containers or under refrigeration. Food not previously in covered containers should be washed first

Washing should be done in a location that will not further contaminate food, dishes and equipment.

Plan on how to store or process food if selling must be delayed for a few days.

You might be told to wash your buildings and equipment with soap and water. Cleaning does not destroy radioactivity. However, cleaning is useful in moving radioactive materials to a place where their effects would be less harmful. You should wear protective clothing during cleaning activities.

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SAMPLE NEWS RELEASE

Notice to Retail Food Operations

If you are advised not to evacuate, remain indoors.

- Close doors and windows
- Turn off the air conditioner, ventilation fans, furnace and other air intakes
- Go to a room with as few windows as possible or a basement.
- If you must go outdoors, cover your nose and mouth with a handkerchief

Put food in covered containers or in the refrigerator. Food not previously in covered containers should be washed first

Washing should be done in a location that will not further contaminate food, dishes and equipment.

Do not accept any food shipment that has not been properly tested for contamination.

Plan on how to store or process food if selling must be delayed for a few days.

You might be told to wash your equipment stored outdoors with soap and water. Cleaning does not destroy radioactivity. However, cleaning is useful in moving radioactive materials to a place where their effects would be less harmful. You should wear protective clothing during cleaning activities.

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SAMPLE NEWS RELEASE

Notice to Outdoor Swimming Pool Operators

Evacuate if you are advised to do so. Keep car windows and vents closed; use re-circulated air. If you are advised not to evacuate, remain indoors.

- Close doors and windows
- Turn off the air conditioner, ventilation fans, furnace and other air intakes
- Go to a room with as few windows as possible or a basement
- If you must go outdoors, cover your nose and mouth with a handkerchief

If you have just been outdoors, take a thorough shower

- Change your clothes and shoes
- Put the items you were wearing in a plastic bag
- Seal the bag and store it out of the way
- Clothes can later be washed as you normally would in the washing machine. Any contamination would remain in the water and not contaminate the washing machine

Upon receiving notice that it is safe to go outside, hose down pool deck, chairs, tables and other outdoor furniture.

Cover the pool if possible.

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SAMPLE NEWS RELEASE

Home Gardening Notice

Evacuate if you are advised to do so. Keep car windows and vents closed; use re-circulated air. If you are advised not to evacuate, remain indoors.

- Close doors and windows
- Turn off the air conditioner, ventilation fans, furnace and other air intakes
- Go to a room with as few windows as possible or a basement
- If you must go outdoors, cover your nose and mouth with a handkerchief

If you have just been outdoors, take a thorough shower

- Change your clothes and shoes
- Put the items you were wearing in a plastic bag
- Seal the bag and store it out of the way
- Clothes can later be washed as you normally would in the washing machine. Any contamination would remain in the water and not contaminate the washing machine

Wash, scrub, peel or shell fruits and vegetables, including roots and tubers, to remove surface contamination as you would for normal food preparation. Remove and discard the outer leaves of leafy vegetables such as lettuce and cabbage.

Do not consume any of your home-grown fruits and vegetables until they have been tested for contamination.

Put food in covered containers or in the refrigerator. Food not previously in covered containers should be washed first

Washing should be done in a place other than in the kitchen to prevent contamination of foods and dishes

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SAMPLE NEWS RELEASE

Notice to Outdoor Special Events

Stay tuned to local radio. Specific instructions will be given by authorities. Local instructions always take precedence to anything written in this press release

Evacuate if you are advised to do so. Keep car windows and vents closed; use re-circulated air. When you have reached shelter, remain indoors.

- Close doors and windows
- Turn off the air conditioner, ventilation fans, furnace and other air intakes
- Go to a room with as few windows as possible or a basement
- If you must go outdoors, cover your nose and mouth with a handkerchief

If you have just been outdoors, take a thorough shower

- Change your clothes and shoes
- Put the items you were wearing in a plastic bag
- Seal the bag and store it out of the way
- Clothes can later be washed as you normally would in the washing machine. Any contamination would remain in the water and not contaminate the washing machine

Put food in covered containers or in the refrigerator. Food not previously in covered containers should be washed first

Washing should be done in a place other than in the kitchen to prevent contamination of foods and dishes

Do not sell or consume any foodstuffs until they have been tested for contamination

You might be told to wash your outdoor equipment with soap and water. Cleaning does not destroy radioactivity. However, cleaning is useful in moving radioactive materials to a place where their effects would be less harmful. You should wear protective clothing during cleaning activities.

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APPENDIX E

U.S. Food and Drug Administration
Accidental Radioactive Contamination
Of
Human Food and Animal Feeds:
Recommendations For State and Local Agencies

Recommended Derived Intervention Levels (DILs)

All Components of the Diet				
Radionuclide Group	(Bq/kg)		(pCi/kg)	
Sr-90	160		4,300	
I-131	170		4,600	
Cs-134 + Cs 137	1,200		32,000	
Pu-238 + Pu-239 + Am-241	2		54	
Ru-103 + Ru-106 ⁽⁰⁾	C3	C6	C3	C6
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	+ ≤ 1		+ ≤ 1	
	6,800	450	180,000	12,000

APPENDIX F

FUNDAMENTAL PROPERTIES OF RADIATION

	Alpha (α)	Beta (β)	Gamma (X –Ray) (γ)	Neutron (n)
Mass	Large mass 2 protons and 2 neutrons (4 amu)(helium nucleus)	Solid mass (about 1/1838 of 1 amu)	No mass electromagnetic wave or photon	Mass of 1 amu
Electrical Charge	+ 2 positive	-1 negative	None	None
Range in the air	Short range ¼ to 2 inches	up to about 10 feet	Very far several hundred feet. Very high penetrating power since it has no mass or charge	Very far. Several hundred feet. High penetrating power due to lack of charge (difficult to stop)
Shielding	2 inches of air sheet of paper dead layer of skin	Plastic Aluminum Clothing Safety glasses	Lead Concrete Water Steel	Materials with high hydrogen content, water, concrete, plastic, polyethylene, boron cadmium
Biological Hazard	Does not represent external hazard. Internal hazard if the source is inside the body (inhaled, ingested, or injected in wound.) Can deposit large amounts of energy in a small area internally	Externally for unprotected skin and eyes. Internal hazard if the source is inside the body (inhaled, ingested, or injected in wound.) Can deposit large amounts of energy in a small area internally	Whole body exposure. Can penetrate through the body. Hazard may be internal or external. This depends on whether the source is outside or inside the body.	Whole body exposure. Can penetrate through the body. Hazard may be internal or external. This depends on whether the source is outside or inside the body.
Sources	Usually emitted by transuranic elements: Uranium, Plutonium, Americium, Radon and Radium	Fissionable products such as Cesium 137, Tritium, Carbon-14, and iodine 132	Fission Products. Many natural emitters in soil, industrial and medical sources. Cesium 137, Cobalt 60, depleted Uranium	Few natural sources. Fission and nuclear reactors. Cosmic radiation entering atmosphere creates neutrons. Plutonium, Californium 252.

APPENDIX G

EXAMPLES OF RADIOACTIVE CHEMICALS

The following table lists various radioactive chemicals, their sources and the type(s) of emissions.

A Gray (Gy) is equal to 100 Rads

Dose Rate: Gy/minute

Chemical	Common Use	Emission
Americium-241	smoke detectors, other instrumentation	alpha rays
Cesium-137	X-ray therapy	gamma & beta
Cobalt-60	X-ray therapy, food irradiator	gamma & beta
Depleted uranium	armor, military ammunition	limited
Iodine (few isotopes)	reactor fission product	beta, some gamma
Phosphorus-32	medical research	beta
Plutonium-238, 239	reactor product, nuclear weapons	alpha
Radium-226	dials, instrumentation	alpha
Strontium-90	product of uranium fission	beta, gamma
Tritium	nuclear weapons, military gun sights	beta
Uranium-238,235,239	nuclear weapons, fuel rods	alpha, beta, gamma

APPENDIX H DOSE LIMITS AND EXPOSURE GUIDANCE

The dose limits below, apply to the doses incurred over the duration of the emergency. The dose to workers performing emergency services may be treated as an “once-in-a-lifetime” exposure, and not added to the occupational exposure accumulated under normal, non-emergency conditions for the purpose of determining conformance with the normal occupational limits. (EPA Manual of Protective Action Guides and Protective Actions for Nuclear Incidents (EPA 400 R-92-001)).

EPA Guidance for Dose Limits for Workers Performing Emergency Services.

Dose Limit * (Whole Body)	Emergency Activity Performed	Condition
5 rem	All activities	
10 rem	Protecting valuable property, Hazard control/mitigation	Where lower dose not practicable
25 rem	Lifesaving or protection of large populations	Where lower dose not practicable
More than 25 rem	Lifesaving or protection of large populations	Only on a volunteer basis to persons fully aware of risks involved.

*Sum of the doses from the external dose and internal dose (from the intake of radioactive material) to nonpregnant, adult emergency workers. Responders performing services during emergencies should limit the dose to the lens of the eye to 3 the listed values and limit the doses to any other organ (including the skin and extremities to 10 times the listed value.)

Dose work rate comparisons.

Dose Rate Recommendations	Actual Values	Exercise Values
Contaminated (Persons)	2 X Background Reading (cpm or $\mu\text{R/hr}$ or mR/hr)	2 X Background Reading (cpm or $\mu\text{R/hr}$ or mR/hr)
Hot Line	1 – 5 mR/hr (0.001 – 0.005 R/hr)	100 $\mu\text{R/hr}$ (0.1 mR/hr)
Work in Hot Zone	1 mR/hr - 10 R/hr (0.001 – 10 R/hr)	100 $\mu\text{R/hr}$ - 1000$\mu\text{R/hr}$ (0.1 mR/hr – 1 mR/hr)
Turn Back Dose Rate (Except Lifesaving)	10 R/hr	1mR/hr
Turn Back Dose Rate (Even for Lifesaving)	200 R/hr	4 mR/hr

APPENDIX I

HEALTH EFFECTS AND EMERGENCY MEDICAL CONDITIONS OF EXPOSURE TO RADIATION

	Pre Clinical	Clinical			Lethal	
Radiation Dose Range	25,000 to 100,000 mrem	100,000 to 200,000 mrem	200,000 to 600,000 mrem	600,000 to 1,000,000 mrem	1,000,000 to 35,000,000 mrem	over 35,000,000 mrem
Vomiting Incidents	None	5 to 50 %	50 to 100 %	100 %	100 %	100 %
Vomiting Delay Time	N/A	3 to 6 hours	2 to 3 hours	15 to 30 min	5 to 20 min	less than 3 min
Leading Organ	None	Bone Marrow, Blood System, Stomach and Intestinal System			Tiny Blood Vessels, Stomach and Intestinal System	Brain, Spinal Cord (Central Nervous System)
Signs	Mild Weakness	Reduced White Blood Cells	Destroyed White Blood Cells		Diarrhea, Fever	Convulsions, Tremors
Therapy	Reassurance	Blood System Restoration	Blood Transfusion Drugs, (Cytokines)	Bone Marrow Transplant	Maintain Electrolytes	Sedatives
Prognosis	Excellent	Excellent	Good	Poor	Death	Death
Evidence of Death	None	0 to 5 %	15 to 80 %	80 to 90 %	Almost 100 %	100 %

APPENDIX J

STAY TIME TABLE

Gamma-ray Dose Rate			Stay Time to Receive This Dose						
<i>Rate/Hr</i>	Rate/min	Rate/sec	1 rem	5 rem	10 rem	25 rem	100 rem	300 rem	400r rem
1 mR/hr	17µR/min	0.3 µR/min	6 week	30 week	1 year				
5 mR/hr	83 µR/min	1.4 µR/min	200 hr	6 week	12 week	30 week	2 year		
100 mR/hr	1.7 mR/hr	27 µR/min	10 hr	50 hr	100 hr	250 hr	6 week	18 week	30 week
1R/hr	17mR/hr	270 µR/min	1 hr	5 hr	10 hr	25 hr	100 hr	300 hr	500 hr
10 R/hr	170 mR/hr	2.7mR/min	6 min	30 min	1 hr	2.5 hr	10 hr	30 hr	50 hr
100 R/hr	1.7 R/min	27 mR/min	36 sec	3 min	6 min	15 min	1 hr	3 hr	5 hr
200 R/hr	3.3 R/min	56 mR/min	18 sec	90 sec	3 min	7.5 min	30 min	1.5 hr	2.5 hr
500 R/hr	8.3 R/min	140 mR/min	7 sec	36 sec	72 sec	3 min	12 min	36 min	1 hr

1 µR = 0.001 mR = 0.000001 R

1 R/hr = 1,000 mR/hr = 1,000,000 µR/hr

Natural Background: Approximately 10 µR/hr = 0.01 mR/hr = 0.25 mR/day

NOTE: Gamma-ray survey meters usually read values in R/hr (nor rem/hr), but the dose limits are given in rem (not R). For gamma radiation, you can consider R/hr and rem/hr to be the same.

The green-yellow-red doses correspond to the 5-10-25 rem guidelines form the Dose Guidelines Table. The gray columns represent lethal doses. A 300 to 350 rem dose is considered the LD₅₀ for humans within 60 days without hospital care. A 450 to 500 rem dose is considered the LD₅₀ for humans within 60 days even with hospital care.

The Calculation for exposure time is: Time = $\frac{\text{Dose}}{\text{Dose Rate}}$

If a responder was in a field of 10 R/hr, how long would it take to receive a lethal dose of 500 rem? = $\frac{500}{10} = 500 \text{ hr}$

APPENDIX K

TIME DISTANCE SHIELDING AND THE INVERSE SQUARE LAW

Three Effective Strategies

Unsealed radionuclides, sealed sources, X-ray machines, irradiators, and other sources may present a hazard of external exposure. Protection from these sources is based on applying three fundamental strategies:

- *Minimize the time* spent near sources (a linear reduction).
- *Maximize the distance* from sources (an inverse square reduction).
- *Use shielding* of appropriate type (an exponential reduction).

Time

Simply reducing the amount of time spent near or in contact with any source results in a proportionate reduction in dose. Minimize the time and you will minimize the dose.

[sieverts](#)/hour x hour = sieverts

Distance

Exposure decreases with distance according to the *inverse square law*, by which the radiation intensity varies inversely with the square of the distance from a source. Increasing the distance from a source by a factor of two reduces the intensity to one quarter. Increasing the distance from a source by a factor of three reduces the intensity to one ninth:

$$1/2^2 = 1/4$$

$$1/3^2 = 1/9$$

This rule has important practical applications. A source with an exposure rate of 100 mR/hr at 10 centimeters from the surface has an exposure rate of 1 [mR](#)/hr at 100 centimeters from the surface, or little more than an arm's length away.

Remote handling tools may be necessary for sources with high-energy beta particles (such as [P-32](#)), high gamma exposure rates (such as Cs-137), or both (such as Na-22). These can be forceps, tongs, vial racks, trays--in short, anything that will put distance between you and the source. In the laboratory, place stock solutions, equipment, and wastes as far as possible from occupied areas and doorways.

Shielding

Proper shielding can result in an exponential reduction of dose for gamma emitters and a near-total reduction for beta emitters. Select appropriate shielding materials during the planning stages of any experiment or clinical procedure. Shielding design may be simple--no more complex or costly than sheets of plywood or plastic--or may involve complex calculations that depend on the type of radiation, the energy and frequency of emission, the configurations of source and room, and the occupancy factors.

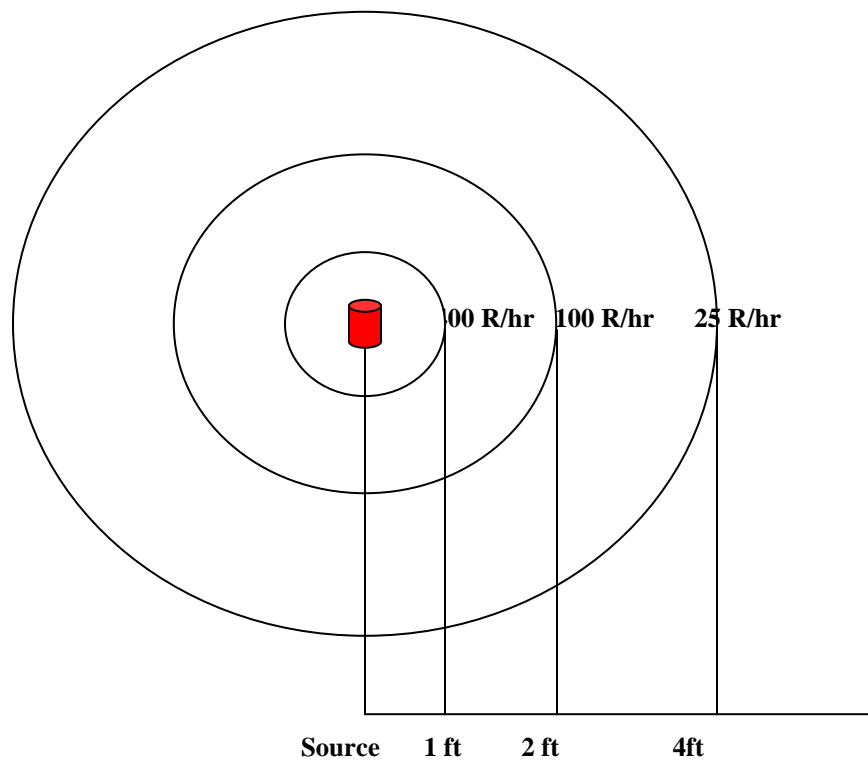
Shielding for Beta Particles

[Beta particles](#) are relatively easy to shield. Since all beta particles have a definite range in matter, one may calculate a thickness of material that will stop them all. See Appendix A for shielding information for common beta-emitters.

Lead is *not* the best material for shielding beta particles. Low density material--wood, plastic, or aluminum--works better. Lead actually may increase the exposure from certain radionuclides. When a beta particle passes close to the nucleus of an atom, its path and velocity may change, giving off excess energy in the form of photons called *bremsstrahlung* radiation. The yield of bremsstrahlung radiation is proportional to the energy of the beta particles and to the atomic number of the shielding material. Lead has a high atomic number, so the amount of beta-particle energy converted to penetrating bremsstrahlung photons may be large. Although only a small fraction of the beta particles may be converted in this fashion, the resulting photons are more penetrating than the beta particles, resulting in unnecessary dose.

Plastics make better shields for beta particles because they have low atomic numbers and little beta energy is converted into photons. If necessary--such as with very large or energetic beta sources--shielding may be layered, with the plastic shield nearest the source and a higher-density shield farthest from the source. The higher-density shield absorbs photons produced by beta interaction in the plastic shield.

INVERSE SQUARE LAW



Point source considerations are important because of the dramatic increase in dose that occurs as responders approach the source. the formula used to calculate the change in exposure as the distance from a point source varies is:

R_1 is the initial rate
 R_2 is the new rate

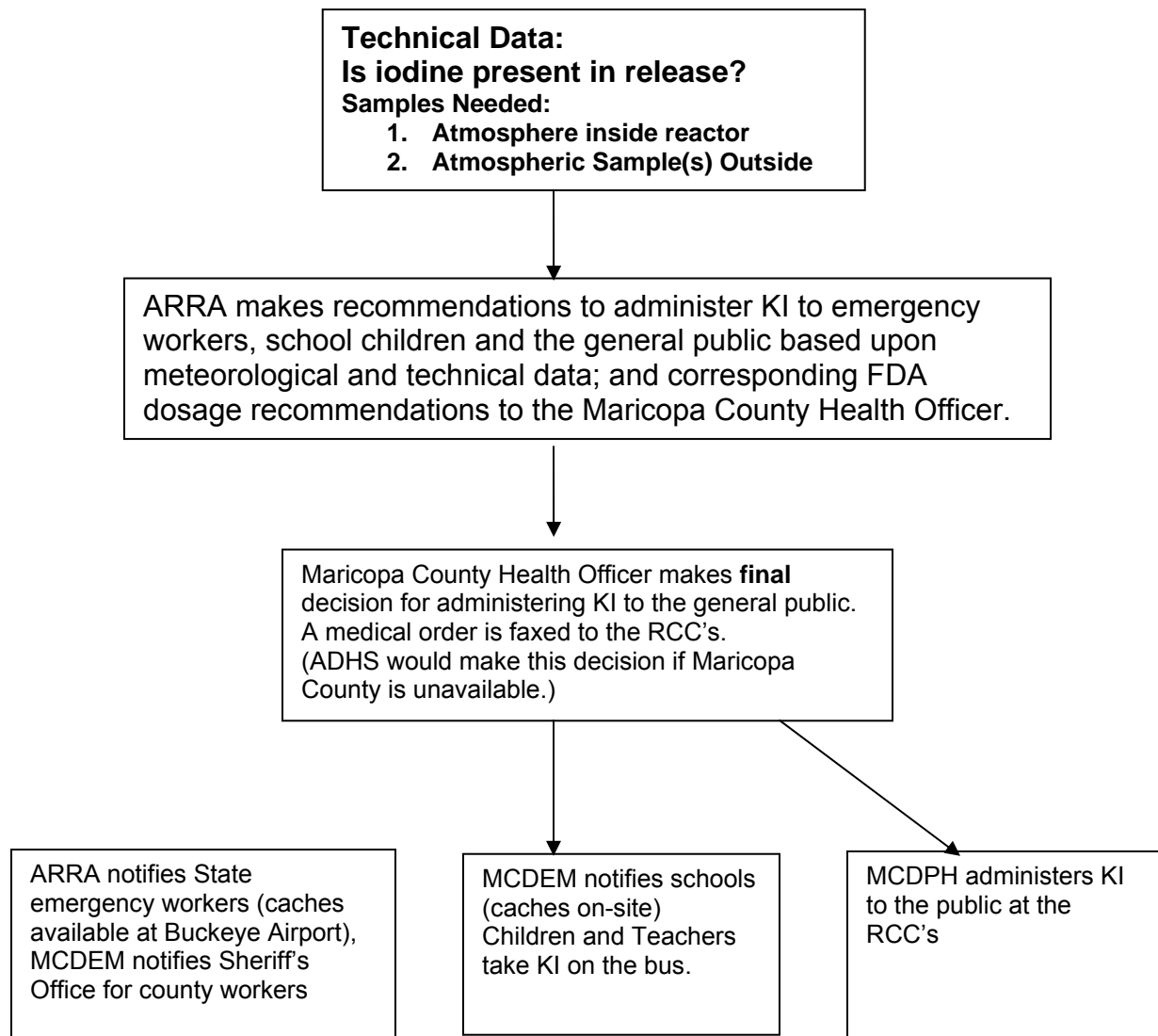
D_1 is the initial distance
 D_2 is the new distance

$$R_1 D_1^2 = R_2 D_2^2 \quad \text{therefore } 400 \text{ R/hr } (1^2) = R_2 (2^2) \quad 400/4 = 100 \text{ as shown above}$$

Double the distance 1/4 the dose rate

Halve the distance 4 times the dose rate.

Appendix L – KI Decision Tree





FACT SHEET

Potassium Iodide (KI)

What is Potassium Iodide (KI)?

Potassium iodide (also called KI) is a salt of stable (not radioactive) iodine. Stable iodine is an important chemical needed by the body to make thyroid hormones. Most of the stable iodine in our bodies comes from the food we eat. KI is stable iodine in a medicine form. This fact sheet from the Centers for Disease Control and Prevention (CDC) gives you some basic information about KI. It explains what you should think about before you or a family member takes KI.

What does KI do?

Following a radiological or nuclear event, radioactive iodine may be released into the air and then be breathed into the lungs. Radioactive iodine may also contaminate the local food supply and get into the body through food or through drink. When radioactive materials get into the body through breathing, eating, or drinking, we say that "internal contamination" has occurred (<http://www.bt.cdc.gov/radiation/contamination.asp>). In the case of internal contamination with radioactive iodine, the thyroid gland quickly absorbs this chemical. Radioactive iodine absorbed by the thyroid can then injure the gland. Because non-radioactive KI acts to block radioactive iodine from being taken into the thyroid gland, it can help protect this gland from injury.

What KI cannot do

Knowing what KI cannot do is also important. KI cannot prevent radioactive iodine from entering the body. KI can protect only the thyroid from radioactive iodine, not other parts of the body. KI cannot reverse the health effects caused by radioactive iodine once damage to the thyroid has occurred. KI cannot protect the body from radioactive elements other than radioactive iodine—if radioactive iodine is not present, taking KI is not protective.

How does KI work?

The thyroid gland cannot tell the difference between stable and radioactive iodine and will absorb both. KI works by blocking radioactive iodine from entering the thyroid. When a person takes KI, the stable iodine in the medicine gets absorbed by the thyroid. Because KI contains so much stable iodine, the thyroid gland becomes "full" and cannot absorb any more iodine—either stable or radioactive—for the next 24 hours.

Iodized table salt also contains iodine; iodized table salt contains enough iodine to keep most people healthy under normal conditions. However, table salt does not contain enough iodine to block radioactive iodine from getting into your thyroid gland. You *should not use table salt as a substitute* for KI.

How well does KI work?

Knowing that KI may not give a person 100% protection against radioactive iodine is important. How well KI blocks radioactive iodine depends on

- how much time passes between contamination with radioactive iodine and the taking of KI (the sooner a person takes KI, the better),
- how fast KI is absorbed into the blood, and
- the total amount of radioactive iodine to which a person is exposed.

Potassium Iodide (KI)

(continued from previous page)

Who should take KI?

The thyroid glands of a fetus and of an infant are most at risk of injury from radioactive iodine. Young children and people with low stores of iodine in their thyroid are also at risk of thyroid injury.

Infants (including breast-fed infants): Infants need to be given the recommended dosage of KI for babies (see **How much KI should I take?**). The amount of KI that gets into breast milk is not enough to protect breast-fed infants from exposure to radioactive iodine. The proper dose of KI given to a nursing infant will help protect it from radioactive iodine that it breathes in or drinks in breast milk.

Children: The United States Food and Drug Administration (FDA) recommends that all children internally contaminated with (or likely to be internally contaminated with) radioactive iodine take KI, unless they have known allergies to iodine. Children from newborn to 18 years of age are the most sensitive to the potentially harmful effects of radioactive iodine.

Young Adults: The FDA recommends that young adults (between the ages of 18 and 40 years) internally contaminated with (or likely to be internally contaminated with) radioactive iodine take the recommended dose of KI. Young adults are less sensitive to the effects of radioactive iodine than are children.

Pregnant Women: Because all forms of iodine cross the placenta, pregnant women should take KI to protect the growing fetus. However, pregnant women should take only one dose of KI following internal contamination with (or likely internal contamination with) radioactive iodine.

Breastfeeding Women: Women who are breastfeeding should take only one dose of KI if they have been internally contaminated with (or are likely to be internally contaminated with) radioactive iodine. Because radioactive iodine quickly gets into breast milk, CDC recommends that women internally contaminated with (or are likely to be internally contaminated with) radioactive iodine stop breastfeeding and feed their child baby formula or other food if it is available. If breast milk is the only food available for an infant, nursing should continue.

Adults: Adults older than 40 years should not take KI unless public health or emergency management officials say that contamination with a very large dose of radioactive iodine is expected. Adults older than 40 years have the lowest chance of developing thyroid cancer or thyroid injury after contamination with radioactive iodine. They also have a greater chance of having allergic reactions to KI.

When should I take KI?

After a radiologic or nuclear event, local public health or emergency management officials will tell the public if KI or other protective actions are needed. For example, public health officials may advise you to remain in your home, school, or place of work (this is known as "shelter-in-place") or to evacuate. You may also be told not to eat some foods and not to drink some beverages until a safe supply can be brought in from outside the affected area. Following the instructions given to you by these authorities can lower the amount of radioactive iodine that enters your body and lower the risk of serious injury to your thyroid gland.

How much KI should I take?

The FDA has approved two different forms of KI—tablets and liquid—that people can take by mouth after a nuclear radiation emergency. Tablets come in two strengths, 130 milligram (mg) and 65 mg. The tablets are scored so they may be cut into smaller pieces for lower doses. Each milliliter (mL) of the oral liquid solution contains 65 mg of KI.

According to the FDA, the following doses are appropriate to take after internal contamination with (or likely internal contamination with) radioactive iodine:

- Adults should take 130 mg (one 130 mg tablet OR two 65 mg tablets OR two mL of solution).
- Women who are breastfeeding should take the adult dose of 130 mg.

Potassium Iodide (KI)

(continued from previous page)

- Children between 3 and 18 years of age should take 65 mg (one 65 mg tablet OR 1 mL of solution). Children who are adult size (greater than or equal to 150 pounds) should take the full adult dose, regardless of their age.
- Infants and children between 1 month and 3 years of age should take 32 mg ($\frac{1}{2}$ of a 65 mg tablet OR $\frac{1}{2}$ mL of solution). This dose is for both nursing and non-nursing infants and children.
- Newborns from birth to 1 month of age should be given 16 mg ($\frac{1}{4}$ of a 65 mg tablet or $\frac{1}{4}$ mL of solution). This dose is for both nursing and non-nursing newborn infants.

How often should I take KI?

A single dose of KI protects the thyroid gland for 24 hours. A one-time dose at the levels recommended in this fact sheet is usually all that is needed to protect the thyroid gland. In some cases, radioactive iodine might be in the environment for more than 24 hours. If that happens, local emergency management or public health officials may tell you to take one dose of KI every 24 hours for a few days. You should do this only on the advice of emergency management officials, public health officials, or your doctor. Avoid repeat dosing with KI for pregnant and breastfeeding women and newborn infants. Those individuals may need to be evacuated until levels of radioactive iodine in the environment fall.

Taking a higher dose of KI, or taking KI more often than recommended, does not offer more protection and can cause severe illness or death.

Medical conditions in which taking KI may be harmful

Taking KI may be harmful for some people because of the high levels of iodine in this medicine. You should not take KI if

- you know you are allergic to iodine (If you are unsure about this, consult your doctor. A seafood or shellfish allergy does not necessarily mean that you are allergic to iodine.) or
- you have certain skin disorders (such as dermatitis herpetiformis or urticaria vasculitis).

People with thyroid disease (for example, multinodular goiter, Graves' disease, or autoimmune thyroiditis) may be treated with KI. This should happen under careful supervision of a doctor, especially if dosing lasts for more than a few days.

In all cases, talk to your doctor if you are not sure whether to take KI.

What are the possible risks and side effects of KI?

When public health or emergency management officials tell the public to take KI following a radiologic or nuclear event, the benefits of taking this drug outweigh the risks. This is true for all age groups. Some general side effects caused by KI may include intestinal upset, allergic reactions (possibly severe), rashes, and inflammation of the salivary glands.

When taken as recommended, KI causes only rare adverse health effects that specifically involve the thyroid gland. In general, you are more likely to have an adverse health effect involving the thyroid gland if you

- take a higher than recommended dose of KI,
- take the drug for several days, or
- have pre-existing thyroid disease.

Newborn infants (less than 1 month old) who receive more than one dose of KI are at particular risk for developing a condition known as hypothyroidism (thyroid hormone levels that are too low). If not treated, hypothyroidism can cause brain damage. Infants who receive KI should have their thyroid hormone levels checked and monitored by a doctor. Avoid repeat dosing of KI to newborns.

October 11, 2006

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Potassium Iodide (KI)

(continued from previous page)

Where can I get KI?

KI is available without a prescription. You should talk to your pharmacist to get KI and for directions about how to take it correctly. Your pharmacist can sell you KI brands that have been approved by the FDA.

Other Sources of Information

- The FDA recommendations on KI can be reviewed on the Internet at www.fda.gov/cder/drugprepare/default.htm#Radiation.
- The Centers for Disease Control and Prevention's Emergency Response Site is available at [CDC Radiation Emergencies \(http://www.bt.cdc.gov/radiation/index.asp\)](http://www.bt.cdc.gov/radiation/index.asp).

For more information, visit www.bt.cdc.gov/radiation,
or call CDC at 800-CDC-INFO (English and Spanish) or 888-232-6348 (TTY).



What You Can Expect From ATSDR

What Is ATSDR?

The Agency for Toxic Substances and Disease Registry (ATSDR) is a federal public health agency in Atlanta, Georgia. The agency's mission is **to serve the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent harmful exposures and disease related to toxic substances.** ATSDR identifies communities where people might be exposed to hazardous substances in the environment. The agency also determines how hazardous a site is and recommends actions that need to be taken to safeguard the health of community residents. ATSDR works with communities, environmental groups, tribal governments, and local, state, and other federal agencies to protect the public health.

What Will ATSDR Do in Your Community?

- Involve communities and tribes when responding to their environmental public health concerns.
- Be independent, be objective, and make public health decisions based on current available science.
- Review and assess environmental, health, and community information and data.
- Contact the relevant federal, tribal, state, and local health and environmental agencies, and always the communities, while investigating a hazardous waste site or release.
- Collect additional data through exposure investigations, limited and targeted environmental sampling, and health studies to assess health impacts.
- Provide and explain the results of our evaluations, medical consultations, and investigations to communities and tribes.
- Provide environmental health education for health care providers, communities, and tribes.

- Provide emergency response assistance for acute hazardous materials incidents.
- Refer individuals to specialists in environmental medicine for health care followup.
- Incorporate in final ATSDR documents comments received from the public on draft documents.
- Refer public health issues or problems to other federal, tribal, state, or local governmental entities when they do not fall within ATSDR's areas of responsibility.

What Will ATSDR Not Do in Your Community?

- Conduct large-scale site- or release-related environmental sampling. The U.S. Environmental Protection Agency and state environmental agencies are responsible for these sampling activities.
- Enforce regulations. ATSDR is an advisory, nonregulatory public health agency.
- Provide medical treatment and health care services.

If you would like additional information, contact the ATSDR Community Involvement Team:

Call: 1-888-42-ATSDR (toll-free) that is, 1-888-422-8737

E-mail: atsdric@cdc.gov

Visit: <http://www.atsdr.cdc.gov>

**Write:
Community Involvement Team
Division of Health Assessment and
Consultation, ATSDR
Mail Stop E-56
1600 Clifton Road, NE
Atlanta, GA 30333**

ATSDR RAPID RESPONSE REGISTRY SURVEY FORM

Hello, my name is _____. We are collecting emergency-related health information, this information is important to us and affected people. May I read you a consent statement, and then ask you some health questions? We are getting information from people exposed to this event so they can receive information about exposures, health, or services. You also may be contacted at a later date to see if you want to join a health study. You are free to enroll in the Registry or not. If you choose to enroll, we will ask you questions that will take about 5-10 minutes. You can choose not to answer any question you wish. All the information will be kept confidential to the extent allowed by law.

98 ☐ Don't Know 99 ☐ Refuse to answer

99 ☐ Refuse to Answer

18. What is that person's full name?FIRST LAST M. I. **19. What is (his/her) home address?**STREET CITY STATE ZIP 98 ☐ Don't Know99 ☐ Refuse to Answer**20. What is (his/her)****A. Home telephone number?** () - 96 ☐ None98 ☐ Don't Know99 ☐ Refuse to Answer**B. Work telephone number?** () - 96 ☐ None98 ☐ Don't Know99 ☐ Refuse to Answer**C. Cell/other phone number?** () - 96 ☐ None97 ☐ Same as Home Phone98 ☐ Don't Know99 ☐ Refuse to Answer**21. Does (he/she) have an email address?**1 ☐ Yes, SPECIFY: 2 ☐ No98 ☐ Don't Know99 ☐ Refuse to Answer**EXPOSURE INFORMATION****Now I'm going to ask you just a few questions about (your/registrant's) experience with this event.****22. (Were you/was registrant) exposed to this event as (CHECK ALL THAT APPLY) :**1 ☐ A resident2 ☐ A passerby3 ☐ An employee4 ☐ A responder or rescue worker5 ☐ A government official6 ☐ A clean-up worker7 ☐ An non-governmental organization/site volunteer98 ☐ Don't Know99 ☐ Refuse to Answer**23. (Were you/was registrant) at the event site when the event started?**1 ☐ Yes2 ☐ No98 ☐ Don't Know99 ☐ Refuse to Answer**24. At the start of the event on [DATE] at [TIME], at what address (were you/was registrant)?** 98 ☐ Don't Know99 ☐ Refuse to Answer**25. What was the name of nearest building to (you/registrant)?** 98 ☐ Don't Know99 ☐ Refuse to Answer**26. What was the nearest intersection?** 98 ☐ Don't Know99 ☐ Refuse to Answer**27. What was the nearest landmark?** 98 ☐ Don't Know99 ☐ Refuse to Answer**28. At the start of the event, (were you/was registrant) (CHECK ALL THAT APPLY):**1 ☐ Inside a building or structure2 ☐ Inside a car or other vehicle3 ☐ Outside4 ☐ At some other location, SPECIFY: 98 ☐ Don't Know99 ☐ Refuse to Answer**29. As a result of the event, did (you/registrant) get injured or ill?**1 ☐ Yes, DESCRIBE: 2 ☐ No98 ☐ Don't Know99 ☐ Refuse to Answer**30. Before the event, did (you/registrant) have any of the following conditions? (CHECK ALL THAT APPLY)**1 ☐ Chronic illness2 ☐ Physical disability3 ☐ Other disability4 ☐ None98 ☐ Don't Know99 ☐ Refuse to Answer

] ► SKIP TO QUESTION 32

31. Please describe your condition: **32. IF REGISTRANT IS FEMALE LESS THAN 12 YEARS OLD OR MALE, SKIP TO QUESTION 33. OTHERWISE ASK: (Are you/is registrant) pregnant?**1 ☐ Yes2 ☐ No98 ☐ Don't Know99 ☐ Refuse to Answer**33. As a result of this event, (are you/is registrant) personally in need of any of the following? (CHECK ALL THAT APPLY):**1 ☐ Medications/supplies2 ☐ Medical care3 ☐ Water4 ☐ Food5 ☐ Shelter6 ☐ Utilities7 ☐ Other, SPECIFY: 8 ☐ None98 ☐ Don't Know99 ☐ Refuse to Answer**34. Which best describes the level of health insurance (you have/registrant has)?**1 ☐ Full or comprehensive2 ☐ Partial or limited3 ☐ None98 ☐ Don't Know99 ☐ Refuse to Answer

] ► SKIP TO QUESTION 36

35. Please give me the name of your health insurance plan. **36. Event-specific question 1.**1 ☐ Response Option 12 ☐ Response Option 23 ☐ Response Option 34 ☐ Response Option 45 ☐ Response Option 56 ☐ Response Option 698 ☐ Don't Know99 ☐ Refuse to Answer**37. Event-specific question 2.**1 ☐ Response Option 12 ☐ Response Option 23 ☐ Response Option 34 ☐ Response Option 45 ☐ Response Option 56 ☐ Response Option 698 ☐ Don't Know99 ☐ Refuse to Answer**That completes our interview. Thank you very much for your time.****TO BE COMPLETED BY INTERVIEWER****38. INDICATE THE SEVERITY OF THE EFFECT ON REGISTRANT**1 ☐ No Obvious Effect2 ☐ Affected, Ambulatory3 ☐ Unconscious, Non-Ambulatory, Or Badly Injured/Ill4 ☐ Dead5 ☐ Not Applicable98 ☐ Don't Know